WHAT IS CLAIMED IS:

1. A solid-state image pickup apparatus including a plurality of photosensitive cells for performing a photoelectric conversion for incident light arranged two-dimensionally in a photosensitive array for receiving the incident light, the photosensitive cells being arranged obliquely adjacent to each other at positions shifted from each other by a length in row and column which is substantially equal to the half of a pitch at which the photosensitive cells are disposed in the row and column direction, wherein an image signal output from an image pickup section for transferring signal charge obtained by the photoelectric conversion by each of the photosensitive cells in response to a drive signal at a predetermined timing is converted to a digital signal, and a picture signal is generated by performing a signal processing on the digital signal,

said image pickup section comprising:

a color separator having color filters for separating the incident light into at least three separated colors, arranged in the column direction; and

a signal reading out section for transferring the signal charge only to transfer devices each arranged in the column direction associated with one of said photosensitive cells,

said apparatus comprising:

a mode setting section for setting, among modes of reading out the signal charges from the image pickup section, either one of a whole-pixel reading out mode of reading out the signal charges from all of the plurality of photosensitive cells and a thinning reading out mode of reading out signal charges after thinning colors of the separated colors at a specified interval;

a drive signal generation section for generating a drive signal according to instruction from the mode setting section, selecting a destination to which the drive signal generated according to the selected mode is supplied and then supplying the drive signal to the destination; and

a control section for controlling generation of a drive signal appropriately for the mode selected in the drive signal generation section upon receiving the instruction from the mode setting section, and signal processing executed for the image signal.

2. An apparatus in accordance with claim 1, wherein the separated colors are either one of a set of primary colors, red R, green G and blue B, a set of complementary colors, green G, yellow Ye and cyan Cy, and a set of complementary colors, gray Gray or white W, yellow Ye and cyan Cy.

3. An apparatus in accordance with claim 2, wherein in said color separator, the color filters are arranged in a column direction in a stripe shape, and a pattern having all colors set in one group is repeated in a row direction.

4. An apparatus in accordance with claim 2, wherein in the thinning reading out mode, said drive signal generation section supplies the drive signal to selectively drive the signal reading out section adjacent to each of the photosensitive cells by every other line.

5. An apparatus in accordance with claim 2, wherein in said image pickup section, a plurality of transfer devices are arranged in a column direction with eight as one unit, the drive signal is supplied through an electrode provided in the signal reading out section and corresponding to each transfer device, independently different from that in the whole-pixel reading out mode.

6. An apparatus in accordance with claim 4, wherein in the thinning reading out mode, said drive signal generation section supplies the drive signal only to one signal reading

out section while a plurality of transfer devices are set as one unit.

7. An apparatus in accordance with claim 4, wherein said drive signal generation section generates:

a first vertical drive signal for transferring the signal charges by two lines in a column direction after the signal reading-out section is driven;

a second vertical drive signal for transferring the signal charges by four lines in the column direction after the first vertical drive signal is supplied; and

a first horizontal drive signal for setting a transfer distance for transferring the transferred signal charges in a row direction to two columns.

8. An apparatus in accordance with claim 3, wherein in the thinning reading out mode, said drive signal generation section supplies the drive signal to selectively drive the signal reading out section adjacent to each of the photosensitive cells by every other line.

9. An apparatus in accordance with claim 8, wherein in said image pickup section, a plurality of transfer devices are arranged in a column direction with eight as one unit, the drive signal is supplied through an electrode provided in the signal reading out section and corresponding to each transfer device, independently different from that in the whole-pixel reading out mode.

10. An apparatus in accordance with claim 9, wherein in the thinning reading out mode, said drive signal generation section supplies the drive signal only to one signal reading out section while a plurality of transfer devices are set as one unit.

11. An apparatus in accordance with claim 10, wherein said drive signal generation section generates:

a first vertical drive signal for transferring the signal charges by two lines in a column direction after the signal reading-out section is driven;

a second vertical drive signal for transferring the signal charges by four lines in the column direction after the first vertical drive signal is supplied; and

a first horizontal drive signal for setting a transfer distance for transferring the transferred signal charges in a row direction to two columns.

12. A method of reading out an image signal from a plurality of photosensitive cells for performing a photoelectric conversion for incident light arranged two-dimensionally in a photosensitive array for receiving the incident light, the photosensitive cells being arranged obliquely adjacent to each other at positions shifted from each other by a length in row and column directions which is substantially equal to the half of a pitch at which the photosensitive cells are disposed in the row and column directions, wherein an image signal output from an image pickup section for transferring signal charge obtained by the photoelectric conversion by each of the photosensitive cells in response to a drive signal at a predetermined timing is converted to a digital signal, and a picture signal is generated by performing a signal processing on the digital signal,

said method comprising the steps of:

setting, among modes of reading out the signal charges, a whole-pixel reading out mode of reading out the signal charges from all of the plurality of photosensitive cells and a thinning reading out mode of reading out the signal charges by thinning colors of at least three separated colors at a specified

interval;

supplying the drive signal according to selected mode by the mode setting step, selecting a destination to which the drive signal is supplied and then supplying the drive signal to the destination;

separating each of the incident lights into the separated colors;

receiving the incident light color-separated by the color separation step by each of the plurality of photosensitive cells;

reading out all the signal charges obtained by the plurality of photosensitive cells in the whole-pixel reading out mode in response to the supplied drive signal after the light receiving step, and performing a field shift for only the signal charges read out from selected one of the plurality of photosensitive cells in response to the supplied drive signal in the thinning reading out mode;

transferring the signal charges transferred in the shift step in a column direction in response to the supplied drive signal; and

transferring the signal charges after transferred in the column direction transfer step and shifted by line in a horizontal direction in response to the supplied drive signal.

13. A method in accordance with claim 12, wherein the separated colors are either one of a set of primary colors, red R, green G and blue B, a set of complementary colors, green G, yellow Ye and cyan Cy, and a set of complementary colors, gray Gray or white W, yellow Ye and cyan Cy.

14. A method in accordance with claim 13, wherein said drive signal supply step includes the substeps of:

generating a field shift signal for reading out the signal

charges from each of the photosensitive cells corresponding to a line for reading in the thinning reading out mode, and supplying the field shift signal;

generating a column transfer timing signal for setting a transfer distance to two lines for transferring the signal charges in a column direction after the field shift signal is supplied, and then supplying the timing signal; and

generating a row transfer timing signal for transferring and outputting the transferred signal charges in a row direction after the transfer in the column direction and the line shift are performed, and repeating the supply of the row transfer timing signal to read out the signal charges of one of the separated colors.

15. A method in accordance with claim 14, wherein in said substep of generating the row transfer timing signal, a row transfer timing signal for setting a transfer distance to two columns is generated when the transferred signal charges are transferred in a row direction, and

in second one of said repeated substeps of the row transfer timing signal, all the line-shifted signal charges are read out.

16. A method in accordance with claim 14, wherein said substep of generating the column transfer timing signal includes:

a first column signal supply substep of first generating a column transfer timing signal for setting a transfer distance to two and four lines, totally six lines, when the signal charges are transferred in the column direction after the field-shifted signals are supplied, and then supplying the timing signal;

a first row signal supply substep of generating a row transfer timing signal for setting a transfer distance to two

columns when the transferred signal charges are transferred in the row direction after the first column signal supply substep, and supplying the timing signal;

a second column signal supply substep of generating a column transfer timing signal for setting a transfer distance to totally eight lines, comprising a couple of four lines, when the column signal supply substep is carried out again, and supplying the timing signal; and

reading out all the line-shifted signal charges after the second column signal supply substep.

17. A method in accordance with claim 14, wherein said substep of generating the column transfer timing signal includes:

a first column signal supply substep of first generating a column transfer timing signal for setting a transfer distance to two and four lines, totally six lines, when the signal charges are transferred in the column direction after the field-shifted signals are supplied, and then supplying the timing signal;

a first row signal supply substep of generating a row transfer timing signal for setting a transfer distance to two columns when the transferred signal charges are transferred in the row direction after the first column signal supply substep, and supplying the timing signal;

a second column signal supply substep of generating a column transfer timing signal for setting a transfer distance to totally eight lines, comprising a couple of four lines, when the column signal supply substep is carried out again, and supplying the timing signal; and

reading out all the line-shifted signal charges after the second column signal supply substep,

said substep of generating the row transfer timing signal including the substeps of:

generating a row transfer timing signal for setting a transfer distance to two columns when the transferred signal charges are transferred in a row direction and supplies the timing signal, and

in second one of said repeated substeps of the row transfer timing signal, all the line-shifted signal charges are read out.